

**SEVENTH APPROXIMATION**  
**DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS (Version 6, 9 April 2003)**

**IDENTIFICATION INFORMATION**

Assessment Geologist:	S.B. Gaswirth	Date:	31-Aug-10
Region:	North America	Number:	5
Province:	Anadarko Basin	Number:	5058
Total Petroleum System:	Woodford Composite	Number:	505801
Assessment Unit:	Viola Group	Number:	50580103
Based on Data as of:			
Notes from Assessor:	Ancillary and coproducts modified from Simpson and Hunton AUs Fort Worth Basin used for calibration		

**CHARACTERISTICS OF ASSESSMENT UNIT**

Oil (<20,000 cfg/bo overall) or Gas (≥20,000 cfg/bo overall): Oil

What is the minimum accumulation size? 0.5 mmboe grown  
(the smallest accumulation that has potential to be added to reserves)

No. of discovered accumulations exceeding minimum size: Oil: 1 Gas: 0  
Established (>13 accums.)                      Frontier (1-13 accums.) X Hypothetical (no accums.)                     

Median size (grown) of discovered oil accumulations (mmbo):  
1st 3rd                      2nd 3rd                      3rd 3rd                       
Median size (grown) of discovered gas accumulations (bcfg):  
1st 3rd                      2nd 3rd                      3rd 3rd                     

**Assessment-Unit Probabilities:**

<u>Attribute</u>	<u>Probability of occurrence (0-1.0)</u>
1. <b>CHARGE:</b> Adequate petroleum charge for an undiscovered accum. ≥ minimum size:	<u>1.0</u>
2. <b>ROCKS:</b> Adequate reservoirs, traps, and seals for an undiscovered accum. ≥ minimum size:	<u>1.0</u>
3. <b>TIMING OF GEOLOGIC EVENTS:</b> Favorable timing for an undiscovered accum. ≥ minimum size:	<u>1.0</u>

**Assessment-Unit GEOLOGIC Probability** (Product of 1, 2, and 3): 1.0

**UNDISCOVERED ACCUMULATIONS**

**No. of Undiscovered Accumulations:** How many undiscovered accums. exist that are ≥ min. size?:  
(uncertainty of fixed but unknown values)

Oil Accumulations:	minimum (>0) <u>1</u>	mode <u>2</u>	maximum <u>10</u>
Gas Accumulations:	minimum (>0) <u>1</u>	mode <u>2</u>	maximum <u>10</u>

**Sizes of Undiscovered Accumulations:** What are the sizes (**grown**) of the above accums?:  
(variations in the sizes of undiscovered accumulations)

Oil in Oil Accumulations (mmbo):	minimum <u>0.5</u>	median <u>1</u>	maximum <u>5</u>
Gas in Gas Accumulations (bcfg):	minimum <u>3</u>	median <u>6</u>	maximum <u>30</u>

**AVERAGE RATIOS FOR UNDISCOVERED ACCUMS., TO ASSESS COPRODUCTS**

(uncertainty of fixed but unknown values)

<u>Oil Accumulations:</u>	minimum	mode	maximum
Gas/oil ratio (cfg/bo)	1000	2000	3000
NGL/gas ratio (bngl/mmcf)	40	80	120
<u>Gas Accumulations:</u>	minimum	mode	maximum
Liquids/gas ratio (bliq/mmcf)	3	6	9
Oil/gas ratio (bo/mmcf)			

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**SELECTED ANCILLARY DATA FOR UNDISCOVERED ACCUMULATIONS**

(variations in the properties of undiscovered accumulations)

<u>Oil Accumulations:</u>	minimum		mode		maximum
API gravity (degrees)	30		38		46
Sulfur content of oil (%)	0.1		0.2		0.4
Depth (m) of water (if applicable)					
	minimum	F75	mode	F25	maximum
Drilling Depth (m)	600		1800		5600
<u>Gas Accumulations:</u>	minimum		mode		maximum
Inert gas content (%)	1		10		20
CO <sub>2</sub> content (%)	0.1		0.2		3
Hydrogen-sulfide content (%)	0		0		0.1
Depth (m) of water (if applicable)					
	minimum	F75	mode	F25	maximum
Drilling Depth (m)	1200		2500		6000

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### ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO STATES

1.	<u>Colorado</u>	represents	<u>4.85</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>          </u>	<u>2.00</u>	<u>          </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>          </u>	<u>2.00</u>	<u>          </u>
2.	<u>Kansas</u>	represents	<u>40.58</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>          </u>	<u>40.58</u>	<u>          </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>          </u>	<u>40.58</u>	<u>          </u>
3.	<u>Oklahoma</u>	represents	<u>40.91</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>          </u>	<u>46.76</u>	<u>          </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>          </u>	<u>46.76</u>	<u>          </u>
4.	<u>Texas</u>	represents	<u>13.66</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>          </u>	<u>10.66</u>	<u>          </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>          </u>	<u>10.66</u>	<u>          </u>
5.	<u>                        </u>	represents	<u>          </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>          </u>	<u>          </u>	<u>          </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>          </u>	<u>          </u>	<u>          </u>
6.	<u>                        </u>	represents	<u>          </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>          </u>	<u>          </u>	<u>          </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>          </u>	<u>          </u>	<u>          </u>

7.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
8.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
9.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
10.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
11.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____
12.	_____	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum		mode	maximum
Volume % in entity	_____		_____	_____
<u>Gas in Gas Accumulations:</u>				
Volume % in entity	_____		_____	_____

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**ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO LAND ENTITIES**  
**Surface Allocations** (uncertainty of a fixed value)

1. <u>Federal Lands</u>	represents	<u>0.90</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.83</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.83</u>	<u>                    </u>
2. <u>Private Lands</u>	represents	<u>97.97</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>98.01</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>98.01</u>	<u>                    </u>
3. <u>Tribal Lands</u>	represents	<u>0.01</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.01</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.01</u>	<u>                    </u>
4. <u>Other Lands</u>	represents	<u>          </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
5. <u>CO State Lands</u>	represents	<u>0.16</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.07</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.07</u>	<u>                    </u>
6. <u>KS State Lands</u>	represents	<u>0.08</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.08</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.08</u>	<u>                    </u>

7.	<u>OK State Lands</u>	represents	<u>0.87</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>0.99</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>0.99</u>	<u>                    </u>
8.	<u>TX State Lands</u>	represents	<u>0.01</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>0.01</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>0.01</u>	<u>                    </u>
9.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
10.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
11.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
12.	<u>                                    </u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>

**ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO FEDERAL LAND SUBDIVISIONS**

**Surface Allocations** (uncertainty of a fixed value)

1.	<u>Bureau of Land Management (BLM)</u>	represents	<u>0.00</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>0.00</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>0.00</u>	<u>                    </u>
2.	<u>BLM Wilderness Areas (BLMW)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
3.	<u>BLM Roadless Areas (BLMR)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
4.	<u>National Park Service (NPS)</u>	represents	<u>0.03</u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>0.02</u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>0.02</u>	<u>                    </u>
5.	<u>NPS Wilderness Areas (NPSW)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
6.	<u>NPS Protected Withdrawals (NPSP)</u>	represents	<u>                    </u>	area % of the AU
	<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
	<u>Gas in Gas Accumulations:</u>			
	Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>



7. <u>US Forest Service (FS)</u>	represents	<u>0.55</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.47</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.47</u>	<u>                    </u>
8. <u>USFS Wilderness Areas (FSW)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
9. <u>USFS Roadless Areas (FSR)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
10. <u>USFS Protected Withdrawals (FSP)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
11. <u>US Fish and Wildlife Service (FWS)</u>	represents	<u>0.06</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.07</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.07</u>	<u>                    </u>
12. <u>USFWS Wilderness Areas (FWSW)</u>	represents	<u>                    </u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>                    </u>	<u>                    </u>

13. <u>USFWS Protected Withdrawals (FWSP)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
14. <u>Wilderness Study Areas (WS)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
15. <u>Department of Energy (DOE)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____
16. <u>Department of Defense (DOD)</u>	represents	0.15	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	0.17	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	0.17	_____
17. <u>Bureau of Reclamation (BOR)</u>	represents	0.07	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	0.08	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	0.08	_____
18. <u>Tennessee Valley Authority (TVA)</u>	represents	_____	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	_____	_____	_____
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	_____	_____	_____

19. Other Federal	represents	0.03	area % of the AU
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<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity		0.03	

<u>Gas in Gas Accumulations:</u>	
Volume % in entity	0.03

20. represents area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

**ALLOCATIONS OF POTENTIAL ADDITIONS TO RESERVES TO ECOSYSTEMS**  
**Surface Allocations** (uncertainty of a fixed value)

1. <u>Arkansas Tablelands (ARTL)</u>	represents	<u>3.09</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>1.28</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>1.28</u>	<u>                    </u>
2. <u>Central High Plains (CNHP)</u>	represents	<u>0.07</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.03</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.03</u>	<u>                    </u>
3. <u>Central High Tablelands (CNHT)</u>	represents	<u>9.60</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>9.59</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>9.59</u>	<u>                    </u>
4. <u>Cross Timbers and Prairie (CRTP)</u>	represents	<u>0.10</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>0.11</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>0.11</u>	<u>                    </u>
5. <u>Redbed Plains (RBPL)</u>	represents	<u>17.19</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>19.60</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>19.60</u>	<u>                    </u>
6. <u>South-Central Great Plains (SCGP)</u>	represents	<u>29.80</u>	area % of the AU
<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity	<u>                    </u>	<u>31.52</u>	<u>                    </u>
<u>Gas in Gas Accumulations:</u>			
Volume % in entity	<u>                    </u>	<u>31.52</u>	<u>                    </u>

7. Southern High Plains (SHPL) represents 27.87 area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity		27.63	

<u>Gas in Gas Accumulations:</u>	
Volume % in entity	27.63

8. Texas High Plains (TXHP) represents 12.28 area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity		10.24	

<u>Gas in Gas Accumulations:</u>	
Volume % in entity	10.24

9. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

10. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

11. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity

12. \_\_\_\_\_ represents \_\_\_\_\_ area % of the AU

<u>Oil in Oil Accumulations:</u>	minimum	mode	maximum
Volume % in entity			

Gas in Gas Accumulations:  
Volume % in entity